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NOTICES OF NEW BOOKS.

Les principes des mathématiques: Avec un appendice sur la philosophie des mathématiques de Kant. Par LOUIS COUTURAT. Paris, Félix Alcan, 1905. — pp. viii, 311.

In view of the keen interest in the logic of mathematics which has recently been aroused among English and American philosophers, this little volume should meet with a very appreciative reception. The first words of its preface disclaim all pretence to originality. Its object is simply to bring together in convenient compass the essential part of what has been accomplished by the more important recent writers in this field. Especial attention is given to the views of Mr. B. Russell, with which the author is in perfect sympathy. The central theme is the presentation of mathematics as a province of logic, — the demonstration, not only that the forms of mathematical proof can be brought into systematic relation with those of the syllogism, but that the fundamental conceptions of mathematics are all implied in the postulates of formal logic.

M. Couturat has executed his task in a manner which could hardly be improved. The mastery of expository style, which was revealed in his great work on Leibniz, is undiminished here. In six brief chapters a *précis* is given of symbolic logic, of the theory of number, order, the continuum, and magnitude, and of the foundations of geometry. Despite the necessary brevity, no pains are spared to make the whole account thoroughly intelligible to readers who are unpracticed in the use of symbolic formulas. Appeal is thus made to a large philosophical public, who might otherwise feel themselves excluded.

On the other hand, very little effort is made to gain the sympathy of those who are prejudiced against symbolic logic; and the few occasions which the author takes to impress its advantages are not well chosen. Thus, for example, he cites (p. 36), as a mode of reasoning unknown to the classical logic, and explicable only by means of symbolic logic, the following: "If the negative of a proposition implies the proposition itself, this latter is true," — a simple case of the *reductio ad absurdum*. It ought not to have been forgotten that the advantages of algebraic symbolism consist wholly in its brevity and clearness, which are such as to enable one not only to draw deductive inferences with quasi-mechanical precision, but also (and more importantly) to detect the introduction of any unwarranted premise. Surely these are advantages of sufficient weight to justify its use, without claiming for it a radical extension of logical principles.

Furthermore, M. Couturat (following Mr. Russell) needlessly compromises his cause by the admission that the two fundamental principles of deductive procedure (the so-called 'principle of deduction' and 'principle of substitution ') "mark the limits of symbolism" (p. 12). "It is evidently necessary," he says, "to define verbally the first symbols and the first formulas . . . [These two principles] cannot be expressed in symbols, just because they are the foundation of the use of symbols." As well say that they cannot be expressed in language, because they are the foundation of the logical use of words. Moreover, a definition of symbols in terms of undefined words adds nothing to their force. It simply imports into the symbols that very haziness of signification, which it is the proper function of symbols to disperse. They must be defined, — as M. Couturat elsewhere (p. 41) clearly shows, — by means of systems of postulates. The source of his misunderstanding is not far to seek. He has momentarily forgotten that logic is simply an analytical, not a constructive science. In developing the system of logic, we must make actual employment of the whole of that system which we are about to describe; and no less than this is implied in the two principles above mentioned. But this shortcoming, if it be such, attaches not simply to symbolic logic, but to every other species of logic as well. It is not fair to call it a "limit of symbolism."

Of the philosophy which underlies this work, one may say without great injustice that it is essentially a seventeenth century rationalism; and the critical reader who chances to have been carried away by more recent tendencies of thought may regard this aspect of the work as detracting from its value. This would probably be a mistake. The detailed researches which are here recorded are well worth appreciation in terms of any philosophy. It will not do to ignore them on the ground of a wholesale objection to their fundamental conceptions. And the hypothesis of a 'rational' system of the deductive sciences is at least convenient as a temporary basis for the present investigation.

As regards the criticism of Kant contained in the appendix, a less favorable judgment must be given. The author's logical machinery is fatally inadequate to his task. In detail, the criticism is irreproachably correct; but it leaves the fundamental issues where it found them. For, after all, the result of the whole argument is but to add another leading question to the Kantian *Prolegomena:* How is pure logic possible? The reduction of formal logic to a system of independent postulates simply throws into relief the fact that these postulates, at least, *are synthetic propositions*, which a Kant might well assume to be *a priori*, and into whose justification he would then certainly proceed to inquire. Perhaps, however, for this very reason, the essay should have an unusual interest for the appreciative student of Kant.

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Lineamenti di una logica come scienza del concetto puro. Memoria letta all' Accademia Pontaniana dal socio BENEDETTO CROCE. Napoli, 1905. — pp. 140.

This book is a criticism of traditional doctrines in the field of logical theory, some of which are modified and others rejected. It is written in